standing. At one time, the Minatogawa beaches were seriously considered for the initial landings in Okinawa, and later as a possible second landing. After the campaign for the south had begun, Minatogawa became a forward loading point.[10] The present village has been completely rebuilt, and the newer buildings, with few exceptions, are frail and undistinguished. The war shows its effects, too, on the southern part of the village where there is a barren acreage, formerly the site of an army camp, its top soil so shallow that the bulldozers in levelling it soon reached the rock beneath.

Nearby Nagamo is a village of a different type. It is divided into two distinct quarters, also a result of the war. The old part formerly was to the north in the main stonecutting area, but following the destruction, a new settlement was started in the farm land a few hundred yards south. Cultivation is marginal on the shallow soil of the sloping valley before it descends into the flat coastal area in which the fishing village is located.

Minatogawa, which means River Port, is a distinctive village reminiscent of the famous fishing town of Itoman, though without its size, beauty, or color.

4

Matsuda

Matsuda is a here-and-there type of village. The village area including the community owned forest is over a square mile. The countryside is dotted with several small sub-settlements. Within each sub-settlement, the houses also are scattered about and separated from one another by large trees, thick growths of shrubbery, grasses, stone fences, and cultivated fields.

The village is located in Ginoza township (Ginoza-son) on the northeast side of the island. This township is in the northern district (Kunigami, or Yambaru). The village is on Highway 13, which winds along the northeast coast through Ishikawa, Kin, Kanna, and Ginoza villages.

Though near the sea, a typical site of a northern Okinawan village, it is a settlement engaged in agriculture and forestry. Its name suggests its nature. Matsuda is a compound of the characters for pine tree, matsu, and rice field, ta, da. Though there is some fishing in the sub-settlements along the Pacific shore, it is casual and a part time occupation for farmers on the coast. Th families exclusively

[Text continues TOP of P. 55--Analyst]

10 The statistics on village destruction are taken from accounts of the villagers. They are estimates. For operations in this area, see Okinawa, the last battle, as cited, 68, 74, 426-27, 436, 439.

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

592 342 magazines and pasted on the wall, and here he entertains visitors who come for conversation or study.

3

Types of Houses

342 In all the villages studied, the houses may be divided into three general categories: (1) the Japanese style house with the thatch or tile roof, (2) the smaller stone house with the Japanese type floor plan, and (3) various shacks resembling in some details the simple structure of the old Okinawan rural house.

[313] [439] [335] The sturdy Japanese type house is made of excellent hardwoods imported from Japan or brought from the forests of northern Okinawa. This house was often constructed without nails. It was put together by mortise and tenon joints, and also with a piece of wood, square on the edge and about three inches long which functions like a dowel. This is known as a kusabi. In modern houses, both of the simple and more complex types, nails are more commonly used.

[355] [411] [352] The eaves of this house are supported by strong poles, unfinished, usually from the Japanese redwood (suri in Japanese, Cryptomeria japonica, D. Don) or the ihumaki (Podocarpus macrophyllus D. Don). The poles are placed on flat triangular stones for foundation support. The houses have plank floors. Both the tile and the thatch roof types (to be described later) have the same floor plan with the size of the rooms determined by the number of mats (tatami in Japanese) desired.

The half tile, half thatch roof is not uncommon, an indication either of a roof partially destroyed by the war which has been repaired by thatch, or a thatched roof gradually being replaced by tile. This is a slow process, as tile is costly. Basically, all of these houses have the same general plan, except for differences in roof materials.

[355] [415] [312] The older Japanese type houses with a tile roof and the newer ones being built on that model are provided with a drain pipe for rain water catchment. This pipe, running along the length and the width of the roof channels the water into a large tank on the ground, reducing the labor involved in carrying water from village ponds or central springs. Many of these rain water catchments disappeared when the old houses were destroyed in the war. Drain pipes cannot be attached to the thatch. In general, rain water is not now a plentiful source of supply in the villages, though buckets and tubs are frequently put out during a heavy downpour, and this water is used for drinking and cooking until it begins to spoil. It may supplement the water carried from a central village faucet, the well, or a pond.

The construction of the Japanese type house is complex. Basically, the design of the house is derived from the arrangement of three rooms,

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175 423 592 Under this old system, when a branch family was established upon the marriage of a son other than the first, his share was made available to him, although it is not clear whether he received this as a legal right, or whether, at each redistribution the father received the branch family share, later passing it on for the use of the son. In any case, provision under the old system was made for branch families in the redistribution just as in contemporary Okinawa this land is supplied, when possible, out of the private holdings of the father. The old and the new illustrate the operation of the family system under two types of land tenure.

175 423 311 Both in the Gushichan area and in Matsuda, there was agreement that the system applied only to rice lands and to dry crop land. House sites were not included in the biennial, quadrennial, or decennial redistribution. Neither were the parcels of genya land which were reserved for tomb areas (bochi, or haka). The forest lands (sanrin) or the genya lands were also communally owned. The reclamation or much of genya land in Okinawa for agricultural uses seems to be a late development, probably a direct consequence of the increase of the island's population. Fifty years ago the island of Okinawa was more heavily forested than it is now. This applies even to the south, if the statements of old people resident in the area can be accepted. Both in the northern and southern communities, pine stands in the forest and in the genya land were publicly owned, and there was a system of tree allotment. Trees in the publicly owned areas, could be cut according to the number of [313] shares of land one had. Then in September and October of each year, each family replanted a number of trees equivalent to the number it had taken.

In these redistributions, apparently the land was not allotted to individual families directly, but first allotted to family groups (kumi) and then in turn to the individual families. There were special [571] allotment groups (jiwari-gumi). It is not clear whether this initial distribution to groups and then to individual families was universal in Okinawa, as this information comes only from Gushichan township.

This system of community ownership, with periodic allotment of rice and dry crop land, naturally called for a system of land classification. Excellent land was rare; good land was not plentiful, poor land was most abundant. The topography was rough and all good land was not in the same

1 (continued from previous page) intervals, the amount in proportion to the number of family members and their work and tax-paying capacities. It was called ji-wari (land-division). Peasants had no right to possess land, but only the right to cultivate, and taxes were imposed upon a village as a whole, not upon individuals." Higa, Shuncho. Structure of the Ryukyuan rural community. The Japanese journal of ethnology, 15 (1950), No. 2, 63-66. English summary (from which this is taken), p. 151.

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

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Care and Conservation of Land

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One of the significant tasks of our time is the study of the relation between population growth and density and the exploitation of renewable and non-renewable resources: the effects of a culture on the land, the forests, the soils and the vegetation must be considered in ethnographic and geographic work. If this is not done the culture is studied as if it rested, like a plate on a table, on a geographic base, without bothering to discover the nature of the environment or what the culture is doing to it.

Nineteenth century studies of primitive and advanced societies emphasized the influence of the physical environment in molding a culture. This crude fallacy, often known as geographic determinism or environmentalism, was exploded by studies made of cultures in all parts of the world in which it became clear that the physical environment is not the cause of cultural differences.

But the reverse of this approach, the examination of what a culture is doing to its physical environment, its soils, its vegetation, and its forests has not been carried on with the vigor with which other aspects of culture have been studied. This point of view has practical significance in day to day administration. Economic matters such as foreign trade or the labor force requirement should not be a separate and independent segment for study. Changes in inheritance should not be viewed solely with reference to the family system. Forest conservation should not be regarded only as a technique and a necessary department in the government.

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The effects of the devastating typhoons, for example, need no elaboration: the destruction of life, crops, houses, of boats, and breakwaters. But their effects are also influenced by other factors. The two southern villages were in the midst of some of the violent fighting of the Okinawan campaign. Large numbers of houses in both communities were destroyed by the war. The new buildings to replace them are so frail that in typhoon times they are often destroyed. This rebuilding requires more wood and more grass. Thus, such factors as the war, the inability to reconstruct permanent housing, typhoons, and the natural growing of miscanthus grass are joined together in a close relationship.

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In the south the relationship of typhoon destruction to deforestation is striking. There is need for tidebreak groves and shelter belts along the coast to protect crops from wind and salt-water spray, a need which fortunately the Ryukyuan Forest Agency is attempting to meet. Deforestation in the south seems inescapably tied up with long occupance. The center of population has always been in the southern part of the island. Not only should there be trees, but they should be planted in the right places. The deforestation of

the deforestation of
the south over a period of centuries thus is related to water spray and wind damage, relationships which a wise administration cannot neglect.

The natural tendency is to think in terms of population and land and of the food which it can produce. But if the population is envisaged in terms of forest, the land, both cultivated and uncultivated, and the role of the uncultivated land in protecting the soil, broader understandings are possible.[9]

It is a significant fact, to use another example, that goats are tethered and not allowed to graze. They do not roam the hillsides, nor crop off the shoots of young plants. If they did, it is possible that legislation controlling the goat might have to be enacted such as has been done in the island of Cyprus.

It is important therefore, to ascertain how a culture makes use of its natural environment and also how it takes care of it. Typhoons cannot be controlled. Neither can periods of drought which often produce water shortages, prevent the planting of sweet potatoes, or the harvesting of a good rice crop. In areas where control is possible, the Okinawans have developed conservation measures. Almost one hundred years ago, Dr. D. S. Green, Fleet Surgeon attached to the frigate Mississippi on Perry's expedition to Japan, wrote:

> "Two objects seem to influence the islanders in all their operations, viz: the retention of water or moisture, and the avoidance of surface-washing. To effect these desirable ends, especially in a rolling country, a great quantity of grading is required, besides very deep culture; and here both of these have been done."[10]

In the areas studied, no serious sheet erosion was observed.

[Text continues TOP of P. 157 -- Analyst]

9 The general ideas and points of view expressed by Edward Graham in his Natural principles of land use, London, New York, and Toronto, 1944, are pertinent here.

10 Hawks, Perry's expedition to Japan, as cited, II, 26-27. The emphasis is in the original. Green continues with further details of grading around streams, along ravines, and on the uplands. His description today would still fit many parts of Okinawa. He was particularly impressed with the lands on a journey between Nugah (i.e., Nago) and Tanegah, southwest of Unten. His whole passage is well worth reading.

Two other forms of land conservation and maintenance, crop rotation and fertilizers, will be discussed under agriculture.

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1

An Historical View of the Okinawan Forest

Northern Okinawa is the woodshed of the island, and there is a steady stream of lumber for building, poles for a variety of uses, charcoal, and of small bundles of wood for the people of the south. In the village of Matsuda, the forest is part of the daily life and economic well-being of the people.

Little is known of the past history of the Okinawan forest.

> "Though it is impossible now to determine the nature and distribution of the original forest cover, it seems reasonable that the major part of Okinawa was originally covered by trees. The forest was probably absent from the beaches, a few marsh areas behind the beaches, rock ledges upon which trees could gain a foothold, and perhaps some areas of Regosols (shallow soils) from calcareous clays in the southern part of the island. It is evident that the present forest has been cut over many times. There seems to be no part of the island in which the forest cover has not been disturbed in some way by man."[1]

The virgin stands have disappeared and left few clues, these authors continue, but it is likely that the original forest cover was comparable to the present stands in composition of species. The authors point out the relationship of cutting to settlement. Cutting must have been a continuing process. In Saion's time, in the 18th century, there was considerable tree planting and measures were taken to protect groves of trees for their value as windbreaks. Excessive cutting could hardly have taken place in olden times in the central areas of the north, whose trees, even today, can be reached only by footpath. No doubt in the past cutting has spread out from village sites and travelled roads. Fire may have been one cause of deforestation, as it has been used to clear land. There are still instances of this.

In Okinawa, the period from 1879 to the end of the Russo-Japanese war seems to have been one of widespread deforestation. (This was contemporary also with the reckless deforestation in the New World). The period after 1906 reflected Japanese concern with forest preservation, especially of the nationally owned forests, a program pursued with varying degrees of success.

1 Okinawa forests (U.S. Geological Survey. Mil. Geol. Sect., Office of the Engineer, GHQ, FEC), 1948, 2.

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

000 varying degrees of success.[2]

311 Another period of recklessness began in 1935 and reached its climax in 1940-41. This deterioration was simultaneous with the increase in the acreage of cut over forest land in Japan beginning in 1941.[3]

313 [12] In Okinawa, exploitation of the forests immediately before and during the war were due, according to residents who lived through the experience, to unrestricted cutting for troop shelters and to the large Japanese military requirements for wood. The war's end brought no relief to the forests. Housebuilding and firewood are continuing challenges to forest conservation in Okinawa. The destruction of houses in the populated south caused continuous cutting for building and firewood. In 1947, rates of cutting were estimated to exceed replacement, the main drains being for housebuilding, firewood, and charcoal.[4]

2

The Forests and the Trees of Matsuda

423 311 Matsuda has a large area of village owned forest within its borders. These village owned lands are a survival of the old land allotment system when the arable, the forest, and the wild (genya) lands were community owned.

[Text Continues Top of p. 226--Analyst]

2 Civil Affairs Handbook Ryukyu (Loochoo) islands, 143, gives these dates as 1879-1906. For a published summary of Okinawan forests, their pre-war and post-war problems, and the role of the Ryukyuan Forestry Agency, see H. Y. Nuttonson, Ecological crop geography and field practices of the Ryukyu islands, as cited, 49-58. Nuttonson, following E. H. Walker, makes interesting comparisons of the islands of the Ryukyus. See the remarks on Miyako, Ishigaki, and Irimote, 54-56. For a short and forceful statement of the problem as it applies to Japan, see A report on Japanese natural resources, Tokyo, 1948, 347-59. Many of these remarks apply mutatis mutandis to Okinawa.

3 Nuttonson, as cited, p. 57. Based on B. O. Hughes, A forest policy for the Ryukyu islands. (Food and Natural Resources Department, USCAR), 1951.

4 Okinawan forests, as cited, 5.

settled area and for protection of the surrounding crops. Around houses, there are common stone fences, bamboo fences and trees. Stone fences, though solid may be toppled over. Bamboo, or dwarf bamboo fences, seemingly slight, resist the winds and remain intact because of their flexible loose weave.

The trees on the ridges of the low lying hills or on high pieces of ground are tall, and sturdy, and jealously protected. The villagers take great pride in them. Today this pride is based on the realisation of their effectiveness; in former times, their protection was associated with the worship of the gods of the sacred grove (utaki). There were beliefs, which now seem to be dying out, that cutting these trees would bring bad luck. Many villagers say that Saion in the 18th century intentionally invented superstitions concerned with the cutting of the trees in order to save them. Now these trees are no longer in danger of cutting, even though the penalties of the old beliefs are no longer feared.

The following short list does not exhaust the kinds of trees and plants found in this area. It is confined to those trees, shrubs, and grasses which are most frequently found and which have the greatest local importance.

(1) The Ryukyuan pine (Riukiu-matsu in Japanese, Pinus luchuensis Mayr). This tree is still one of the commonest sights of the island, even in southern Okinawa. At present, it is a source of firewood, cheap lumber, and siding. It is not considered good housebuilding material because of termites (shiroari). Pine was used for fishing boats within living memory, but now they are made of much harder woods. In this area, the coniferous groves are along the seashore. The larger stands are not cut. Scrub pine on individually owned wild land may be cut for firewood.

(2) The fukugi (Garcinia spicata Hook.). The fukugi is used around homes and on mountain ridges as a typhoon protection. It is fairly plentiful here and prized as a building material (kenchikuzai). The hard studs, beams and cross beams and the wide plank floors in the older and better houses are often made out of this wood.

(3) The iju (Schima luchuensis Nak.). This tree, common here, is used as a building material and is considered to be better than the Japanese redwood (sugi). It is not regarded as a good firewood.

(4) The inumaki (Podocarpus macrophyllum D. Don). This tree is not well known here, and there are no large specimens. But it is regardod as the best building material when available. Often the large, hard, rough hewn poles which are placed on stones and support the eaves of the older houses are made from this wood.

(5) The shii (Shiia cuspidata). The dense stands of this tree in the village owned forest restrict the size of the specimens, though

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is isolated spots the tree grows to a considerable height. This is a favored wood for housebuilding materials. It is also used for firewood.

(6) The mokumao (Australian pine, Casuarina equisetifolia L). This is a fast growing tree and quite plentiful in this area. The mokumao is commonly a shelter belt tree here. Along with the pine, and the shii, it is used for firewood.

(7) The shuro (Prachycarpus excelsus Wendl. Var.). Individual specimens of this palm are scattered through the village. It is found in local ravines, sinks, and near the natural bridge. When it was more plentiful, rope was made from its fibres. Before the war, it was the standard material of the farmer's raincoat. Rope making continues on a very restricted scale.

(8) The soshiju (Acacia confusa Merr.). Individual acacia trees are numerous but scattered. Frequently the tree grows on the house site as a typhoon protection. It is also used for firewood. Branches of the soshiju are often placed over or around young vegetables and other plants to shield them. Its leaves are placed on the dry crop lands and on paddy fields as a fertiliser.

(9) The gajimaru (Ficus retusa). This banyan tree was noticed by earlier travellers. It is a picturesque tree. The exposed roots twine around lesser shrubs, stumps, and stones. Specimens are scattered, and its chief use, here and in the southern villages, is for typhoon protection. Smaller trees, their roots growing in an around the stone fences, are a common sight. The leaves may be used for fertilizing the soil of rice fields.

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(10) The cycad (sotetsu in Japanese, Cycas revoluta). This plant has already been discussed. While more frequent here than in the south, it is not plentiful. One must go farther north before the cycad becomes important in the daily economy. In Matsuda, the fronds are used to protect young growing plants, the leaves as a fertilizer for plants other than rice. Occasionally starch and a bread are made from the seed. Fermented drinks were once made from the cycad. There is no present market, as there was in the past, of fronds used in funeral wreathes.

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(11) Suzuki (miscanthus sinensis, Chinese silver grass), commonly referred to as kaya, upon which we have already commented so frequently. This grass is not so important here as in the southern villages because of the availability of superior wood and fibres from the forest. It is not used as a major fuel, nor to any great extent for roofs, since the dwarf bamboo is available. The grasses collectively known as susuki are used as a fertilizer. The young shoots are often given to horses, cattle, and goats. One does not observe here the dominance of this plant, such a conspicuous part of the landscape of the south.

824 (12) The pandanus (adan or takonoki, Japanese scientific name, Pandanus odoratissimus L) is also scattered. Formerly the pandanus was widely used in Okinawa for slippers and a Panama type hat was made for export. This home industry has disappeared from Matsuda, as it has from the south.

(13) The i (Juncus effusus, Linn. var. decipiens Buch). This rush is used in the better quality home made mats (mushiro). The i is generally the warp of these mats, with some other grass the weft. It is occasionally cultivated when rice paddies are not in use, as it requires much water. There are two varieties of i, the round, and the three cornered (sankaku). The three cornered variety is used in cheaper quality mats. The round variety with cotton string as the warp, is used in weaving the best mats.

(14) The Yambaru bamboo (Yambaru take). This I believe is the same as, or at least very similar to the Japanese sasa, or dwarf bamboo (Arundinaria communis Mak.). Yambaru take means "northern district bamboo" and throughout Okinawa the term is used to describe this valuable plant. In appearance, it resembles the susuki grass, but its stalks are much woodier, have a greater diameter, and the plant is much taller. In an uncleared forest, the Yambaru bamboo grows six to nine feet high and has a foothold wherever there is the slightest room in the forest. Patches often are intermingled with the shii, pine, and the numerous shrubs. This is the roof thatch material of the north. Its other uses include the weaving of stationary barriers (hinpun) in front of the house compound. The stalks are closely woven diagonally while still green. The plant has innumerable uses, depending on individual improvisation. While green, [285] charcoal containers may be made out of it; it may be woven into rough [415] baskets (zaru) for carrying sweet potatoes, or to bind up the small bundles of firewood which are sent south. In general, the smaller diameters of Yambaru bamboo are used for roofs; the larger for bamboo fences (takegaki) and the face level hinpun. Bundles of Yambaru bamboo are sent to Naha and Shuri for weaving.

3

The Uses of the Forest

313 Clearcutting seems to be the curse of traditional Oriental forestry. Starting at the convenient base of a hill or mountain, every tree has been cut up the hill until a steep or inaccessible part is reached. This destructive exploitation has been an established Japanese forestry practice despite the obvious inducements to soil erosion.[5]

The results of clearcutting observable near Matsuda now are a product of the overwhelming war and post-war demand for lumber and

5 A report on Japanese natural resources, as cited, 357.

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fuel. The usual practice here too is to clear cut up a steep hill or mountain, the lower and more convenient the spot, the more efficient the clearcutting. Weeds, shrubs, grasses, and the Yambaru bamboo have quickly taken the place of the trees. The man induced climax vegetation is grass and shrub. 313 [137]

Forest destruction in Okinawa does not seem to have reached the alarming proportions observed in Japan.[6] The destruction of the war increased the demand for lumber and firewood. This demand accelerated the dangerous practices and led to widespread waste.[7] Fortunately, if Matsuda is a good example, the roads were poor and underdeveloped, and the mills small. There was some brake on uncontrolled deforestation.

In the accompanying photograph of the Matsuda forest area, there was access to the summit and the trees there were cut down. For some reason, probably the steepness of the mountain side, the pine and shii on the slopes were not cut. The result was that tall stands of dwarf bamboo took over the spaces on the summit left by the trees, while the trees continued to grow on the mountain sides. [137]

Since the forest is owned by the village, any resident may cut trees for his own use. This custom has few dangers because it is a large forest with a small population in the environs. The cutting is scattered. The villager selects the tree with the consent of the village official in charge of forest control, cuts it and takes it to his courtyard. There is a charge of Y1 for each large tree, or Y1 for five small trees. This money goes to the village office. Villagers' personal needs are a small drain on the forest resource. [423] [624] [651]

The village government also sells wood. In lulls in farming, or when the farmer needs some cash, he may cut trees for the village. Wood cutting for lumber is a year round activity. September to December is the season for cutting firewood. There are two common practices in commercial dealings with wood and lumber. For cutting and gathering firewood, the village office pays Y5 a bundle, Y4 goes to the person cutting the wood, and Y1 to the village office, 60% of which it retains and 40% going to the township office. 313 655

Cutting and gathering wood is by no means an easy task. The walk to the forest may take an hour one way, though there may be truck transportation part way. The trees must be cut, the wood chopped up and made into the familiar bundles tied with a stout rush (often the i) and carried back or put in a central location to be picked up later. This marketing of wood on an individual basis is casual and intermittent. More continuous and larger scale exploitation takes place when the village office sells a certain area for cutting. The village takes 60%, the township 40% of the proceeds. [655]

6 Ibid, 285-87. [Text continues on p. 232.--Analyst]
7 Okinawan forests, as cited, 2-3, 5-8.

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

40% of the proceeds. The trees thus sold are all cut down. After clearcutting, the area is left to natural reseeding. About twenty years hence, the clearing will again be sufficiently forested to permit repetition of the same procedure. This follows an established Japanese pre-war practice. This was known as the five year period share (gonenkanbun). The forest is divided into subdivisions, each 110 chō in area. (A chō is 2.45 acres). These 110 chō plots are in turn subdivided into five parcels of twenty-two chō each. Each year one of these five subdivisions may be cleared.

Throughout the forest, divided up into these plots, there may be a five year cycle of cutting, but not all the plots are available every year. If this were so, the forest could be cut over in five years. The system is planned so that there will always be parcels being cleared, those in various stages of regrowth, and mature stands. During and after the war, this practice broke down in favor of uncontrolled cutting.

If a family has little cash, a villager may pay his taxes in part by cutting wood. The village office pays Y4 for a bundle of firewood (late 1951), Y2 going to the villager as a cash payment, and Y2 being applied to his taxes for the year.

The farmer makes frequent excursions to the mountains to obtain firewood or poles to make improvements in the compound, such as repairing a tool or food shed. Men do this work, especially when the distances are far, but the participation of women is by no means exceptional. Along the roads of northern Okinawa, one can frequently see old women walking down from the mountains carrying bundles of firewood on heavy poles. Much of the wood is hand carried from the mountains; if the farmer has a horse and cart or a truck, the wood is carried to a convenient road for loading and transport.

Charcoal is manufactured in the forest area. In Okinawa charcoal has many uses, mainly for heating and cooking, and for charcoal sticks (senko). Lumps of charcoal are placed in braziers and the sticks are used as touchwood in place of matches and in ceremonial and religious observances. Charcoal containers (tangu) are often constructed on the spot. These are round or box-shaped and made out of the dwarf bamboo.

Charcoal kilns are privately owned. They are of the simplest sort. The kiln may be covered with a rude housing, built up by poles and a thatch roof. A mound of large boulders and dirt is built with an opening on the dirt floor running the length of the firing area. Poles which have been stripped and cut in various lengths, from five to nine feet, are shoved in the opening and moved forward as they burn. The smoke comes out the back.

Forest maintenance and improvement is, in part, a result of community endeavor. With some exceptions, each person in the village from 16 to 60 participates one day a year in forest improvement (sōrin).[8] The participants are boys past school age, unmarried girls, and all men up to the age of 60. These people work without personal remunera-

[8] The usual meaning of sōrin is afforestation or reforestation. In Matsuda it is used in the sense of care and improvement of the forest.

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tion, but the village receives payment, through the township, from the central government for this labor. In November 1951, the rate was ¥80 per day for each male, and ¥50 for each female. Married women do not participate, except to take the place of a husband who cannot attend. This community project is a continuation of pre-war custom. On the day set aside for this work, the participants are taken part way by truck or bus. A half hour walk over the paths, often leading through dense thickets, brings them to the site selected. Everyone brings his own lunch, perhaps in a little metal box, or merely wrapped in banana leaves. Around noon, the girls take their buckets, go down hill to the stream, and carry up the water for the tea. Weeds and grasses, especially miscanthus and the dwarf bamboo are cleared out from the predominating shii and pine. A shii is known here as the shiigi or shiija. When work begins the area is almost an impenetrable thicket. The grasses and the thick dwarf bamboo have grown up in dense stands among the trees. Only these grasses are cut. Trees are not touched, except for the very young ones in overcrowded spots, or the malformed and dying trees. With the brush and grasses cut, the stand of trees is still dense.

When the undergrowth has been cut down, one can walk through the area. The cuttings, as well as the litter on the forest floor, are not removed. This wise practice keeps the soils at least at their normal productivity. In this area, the relatively low density of population, the scattering of settlement, the large areas of [311] forest compared with the cultivated areas have not brought about conditions requiring the removal of forest litter for fertilising fields and for fuel, a practice which creates acute problems in Japan.[9]

[637] The work is supervised by a forestry official living in the village but an employee of the township. His supervision is nominal, as everyone knows what is to be done and how to do it. Like all officials of a village, he is a friend, neighbor, or relative of those who participate. He checks off the names of those who have reported. On returning from the forest at five in the afternoon, most of the villagers bring back some wood, perhaps a long pole, a bunch of dwarf bamboo, or miscanthus to make an outdoor broom. They are lighthearted as they return single file along the winding paths back to the village.

Pine cones are gathered for their seeds by the co-operative effort of the villagers. The cones are soaked in water so the seeds can be removed more easily. The village office takes the seeds, [C55] gives them to the township office which sells them to the central government for planting purposes. Once a year, the village receives 10% of the amount of seeds it collected for its own planting purposes.

9 A report on Japanese natural resources, as cited, 358.

1: Glacken E-5 (1951-1952) 1953 AC7 Okinawa AC7

Every three years, the villagers thin out the dwarf bamboo and other grasses in the pine stands along the coast. Late in December or in early January, there is a community planting of pine seeds.

The tools used in forest work are: the hand sickle (kama), a bill or hook knife, the tool so familiar in agriculture; an ordinary long knife resembling a butcher knife or a machete (here called a yamakatana, or "mountain knife"), and a hooked knife on the end of a long handle (sōringama).

Forest care goes well back into Okinawan history and antedates more recent Japanese methods. This care probably was an obligation in the old system of land tenure under which villagers had access to forest lands with the corresponding obligation to replant.

4

An Example of Reclamation

There are cut-over tracts in Matsuda village. The Japanese government, according to local residents, tried to convert these cleared areas into agricultural land. This land reclamation (kaitaku) began about 1935. The land was cleared of its remaining trees and shrubs mainly by firing. (Fire has been used in Okinawa, possibly from early times, in the clearing of land. In 1947 the use of fire in clearing and the hazards in creating forest fires were pointed out by observers who blamed carelessness in firing as the cause of the forest fires in the dry season).[10] Firing was easier and some nutrients from the ash were available to the poor soils.

In Matsuda, the cleared land was hoed and the rocks were removed. It had to be hoed deeply to make cultivation possible. The land was enriched with composts containing horse, pig, and goat manures. The original plan was to promote a more extensive type of agriculture on the reclaimed land because it was poorly adapted to the cultivating methods on the better and more accessible soils. A here-and-there (yadori type) settlement was planned. The houses were to be scattered on hillsides, or in the valleys, to provide sufficient land, admittedly poor, for the settlers to cultivate. The size of the contemplated holdings precluded hand labor of the intensity characteristic of the usual agriculture. The use of draft animals, plows, and harrows was part of the plan.

The war and the disappearance of so many of the draft animals prevented its realization. Before the war, it was intended that each family should have a 3000 tsubo tract (2.45 acres). Today the residents on these lands cultivate only about 1000 tsubo, about the limit of manual cultivation considering the soils and the stone that remains. As a consequence, parts of the area are returning to weeds, grasses, and shrubs.

10 Okinawa forests, as cited, 7.

361 [167] After the war, this cleared land was further settled, with American encouragement, by families returning from abroad. This subdivision of Matsuda, a here-and-there settlement, is called "the clearing" (kaikon). Its houses are few and far apart, and with its isolated farmsteads is in contrast with the thickly settled cluster of a typical agricultural village.

5

Conservation

313 [647] In Matsuda, the preservation of the forest is constantly encouraged. This awareness, inspired by officials of the Ryukyuan Forestry Agency and its American advisors, reaches down to the school children. Before any burning is done, a permit must be secured. Fire lanes (bōkasen) are cut to prevent the spread of fire. These lanes are circular, and an area on the lee side is burned to prevent spread of the fire in the direction of the wind.

Fire Lane (Bōkasen)

In addition to the fire protection, officials of the Ryukyu Forestry Agency and specialists in the American Civil Administration are trying to discourage overcutting (kanbatsu) which in this area has affected the most numerous species, the pine, the shii, and the Japanese redwood. Since clearcutting (kaibatsu) so easily leads to overcutting, the former practice is also being discouraged. The newer emphasis is on selective cutting (takubatsu).

[813] School children participate in forest conservation. The children attending high school at nearby Ginoza village take part in forest improvement. An active campaign for conservation and forest fire prevention could not begin immediately after the war. In the post-war confusion, it was not until about 1950, with the establishment of [647] the Ryukyuan Forestry Agency, that active supervision on a central government level could be seriously instituted. On an island wide basis, posters and literature pointing to the dangers of forest fires [208] have tried to bring this message to the Okinawans as well as to the Americans. The name of Saion has been used to tie the preservation of the Okinawan forests in with the history and traditions of the people. The famous "Smoky" appears on posters as well.

[727] In the Matsuda area, the recent periods of relaxation or loss of control, according to local residents, were (1) about 1940 when

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wood and lumber for Japanese army uses and for air raid shelters were in demand, (2) the burning in the course of the war, and (3) the intense cutting after the war for firewood and rebuilding.

Okinawan traditions relating to forest care have a positive value and it is worth while to recapitulate them here. Local old men and antiquarians in Matsuda give credit to Saion who wrote a long treatise on agriculture and is said to have intentionally devised superstitions to save trees. Death or misfortune would come to him who cut the trees, especially those in sacred groves or on the tops of mountains. Some local residents have said that the gods of the mountain are really not of religious inspiration at all, but had their origin in the conscious desire of Saion to save the trees. While there does not seem to be any truth in this assertion, since these deities of the sacred groves and mountain tops reach far back into antiquity, there is no doubt that sacred groves and houses of the mountain gods saved trees that otherwise would have been cut down. (In China and Japan, religious shrines and holy places have also been areas of the preservation of trees).

Present attitudes were summarized by a Matsuda school principal who said that beliefs in mountain gods and in death and misfortune following cutting trees were dying out, and that these old beliefs had been replaced by awareness of the scientific reasons for preserving the trees.

In Matsuda, pride in the trees, in the groves that line its hill tops and overlook the narrow valleys and ravines planted to rice and other crops is a conspicuous part of village experience. There are trees along the main road near the town that are said to have been planted in Saion's time under his inspiration.

These favorable traditions are helpful. They do not guarantee the preservation of the forests. Previous experience has shown this. From what may be surmised of the history of Okinawan forests, the destruction of modern times has been correlated with war and the expansion of economic activities. We may speculate, too, that previous deforestation was slow, inexorable and related to the clearing of accessible stands near settlements, and the extension of these settled areas as they grew. "Most of the accessible primitive forests have been exhausted," Dr. Green wrote in his report to Commodore Perry.11 The need for fuel increases with population. In China, Japan, Korea, and Okinawa, the relation of forests, either as a source for lumber or fuel, to population growth and settlement is a very intimate one. This is a basic consideration in discussing not only the "patterns of culture" but the relation of culture to the natural environment in this part of the world.

11 Hawks, Perry's expedition to Japan, Vol. II, 35

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Conclusion

In the comparative study of these villages, certain distinctions are worth summarizing. (1) In the southern villages, which lack forest land, there is much more dependence on the uncultivated wild land (*ganya*) which supports the grasses. (2) The forest, in Matsuda as elsewhere in the north, is a reserve for necessities like firewood, thatch, charcoal and building materials, both for local use and southern trade. (3) The shelter belts and groves have been preserved in the north. (4) Tidewater plantings of shelter belts are needed in the south. Plantings of the Ryukyuan Forestry Agency, under American Civil Administration encouragement, have begun in the south as protection from wind and salt water spray damage. These include the *mokumao*, the pandanus, the hibiscus (*Albizzia julibrissum* Durazz, in Japanese the *nemunoki*) and the *hirugi* (*Bruguiera* spp.)[12] (5) Ecologically, the situation is more balanced in the north where a good start seems to have been made in arresting progressive deforestation. (6) This balance, if Matsuda is a representative village, can only be maintained by constant appraisal of the relationships of the forest to agriculture, to the growing population, and to the economic demands to which this leads, unless the wood and timber demands of the island are to be met in large part by imports.

An occupying power like the United States, rich in modern techniques, can do much to improve the life of a small island people. If it is mindful of the history and the present features of the culture, it can suggest improvements without destroying the bases on which the culture rests.

One of its greatest accomplishments could be an aggressive and continuing program of conservation and afforestation. The present administration, through the Forestry Section of the Food and Natural Resources Department, has started a program which, if permanently pursued, could have far-reaching consequences. An emphasis on selective cutting, conservation, fire control, tidewater plantings, and many other measures could only be a credit to American administrators and foresters as well. The costs, as such things go, would be moderate.

From personal experience in village life, I have no doubt that the co-operation of villagers in all parts of the island could be readily obtained in advancing a large scale afforestation program. The readiness of the people of Matsuda cannot be an exception. These things could be accomplished without an unwieldy administrative apparatus. I have been continually struck with the ability of the Okinawans, with their skill in local organization, to accomplish

12 I am indebted to Mr. Richard Varney of the Department of Food and Natural Resources, USCAR, for this information.

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things quickly and simply. One need not think of large centralized programs but of many small efforts, working through the simple channels of local government.

In the decades to come, a thriving and self-supporting forest, with shelter belts and tide-water plantings, will be a great asset to the Okinawans, an accomplishment in which the American people can share with pride.

But actually no family is entirely self-sufficient, for each needs to purchase foodstuff as well as ready-made clothes, manufactured mostly in Japan, more substantial building materials, such as better grades of wood, tiles, and cement, tobacco, alcoholic beverages, sweets, toilet articles, some medical supplies, and other luxuries. Farmers buy their tools; students their books and writing materials. Finally, cash is needed to pay taxes.

In addition to the utilization of sugar, pineapple, firewood, and building materials for cash, Tairans also raise pigs for sale to slaughter houses, and some families derive an income from raising silkworms and producing tea. Fishermen sell fish inside and outside the village, and a small group of people are salaried workers or have an income from specialized services.

Village leaders fear dependence on rapidly dwindling forest resources, still the main source of ready cash. They realize that the present modest living conditions of all families could be much improved if Tairans concentrated on increasing the cultivation of subsistence crops and farmed more intensively to raise cash crops. Most people lack this insight, however, and live on a day-to-day basis without much thought of the future. This is an island-wide problem which has the attention of central government agencies, and a great deal of educational propaganda comes to the village through government channels.

AGRICULTURE

The productivity of the land varies not only with its quality but also with the industriousness of the owners. Farmers who show foresight, those who seem to be under less pressure for immediate cash, take off more time from forest work to cultivate fields during planting season. The village headman and council members remind everybody during village meetings and informal discussions that work in the fields should not be neglected. With the approval of the whole community, the first and 15th of each lunar month have been set aside for farming. On these two days it is forbidden to go to the forests to cut wood. Such agreements are usually observed (as a rule), and they help to achieve their purpose but are not completely effective.

Rice is planted and harvested twice a year. The first rice is prepared in January when seeds are put into special beds where they are left to grow into young shoots until March. Until about 30 years ago it was said that all people seeded rice on the same day while prayers were

of the permanent Tairan families fish; the majority of the fishermen only two 226 are migrants from the surrounding islands who come for a season, [166] leaving their families behind. A few families have moved in permanently. The fishermen supply Taira, but most of the catch is peddled [438] in the Nago market by the fishermen's wives. Some of the more enterprising and mercantile-minded women in the village buy up fish and [443] peddle it for a profit.

Two or three times a year, during February or March, large fishing 226 boats from Henza Island land in Taira with whale meat. All the able 443 women look forward to making extra cash at this time, for whale meat is considered a delicacy in homes where meat is rare. Blubber is eaten [262] and used as frying fat. The distribution of whale meat is arranged by one village woman whose fishermen relatives from Henza supply it in response to her request. She acts as agent, distributing the meat to the women on consignment.

LUMBERING

The main source of immediate cash for most families is firewood. 313 ● Forest land in the mountains is owned by the township and the village, [423] except for some woods near the fields, which are personal property. The township permits the village to exploit a certain region surrounding the community in return for payment of a forest tax. This tax is [651] levied on firewood bundles or on lumber sold by villagers. Everyone in the village is free to cut wood in the designated area in any amount he desires. This, however, does not imply that unlimited cutting is possible, for resources have been utilized so heavily that most forests near the village are almost cleaned out, and it has become increasingly difficult to find wood. Reforestation has only recently been introduced [185] on a serious scale. Often villagers are found trespassing on land owned [423] by the central Ryukyan government in order to cut from the less de- [685] pleted forests there. Government officials are sympathetic to the villagers' plight, and they tend to dispose of such transgressions with a stern warning.

Men and women, and during vactions, some children over 12 years, [857] go to the forest. Most people prefer to walk and work in small groups. To reach a place high up in the hills, they may have to hike almost a mile from the center of Taira. The steep, narrow paths made by wood- [487] cutters traverse the mountains. Following the approach trails during the day, one can hear voices and the sawing of wood from many directions. All lumber people carry a short handsaw and a heavy bush knife [412]

313 which they use interchangeably. After sufficient trees have been cut and [412] cleared of branches, a large bundle of firewood is carried to the village. Most forest workers make four or five trips a day into the hills—two or three during the hot summer season. As the afternoon ends, they sit down along the road in the village or nearby to prepare firewood 474 bundles. Pieces of wood are inserted through a bamboo loop of stand- 313 ard size, prescribed by the cooperative store, until a tight, uniform bundle is obtained. The last piece has to be driven into the bundle by force. All over the village one can hear the knocking of wood pieces [592] which marks the end of a forest worker's daily labor. Each household works independently and sells firewood to the cooperative. A store [436] clerk travels around the village in late afternoon, checks all bundles, and issues credit slips to each household; these can be changed into money at the store. The following morning the truck, owned by the [438] cooperative, carries the firewood to Naha or Itoman where it is sold to a dealer who redistributes it to individual consumers or public bathhouses. The northern part of the island has always supplied firewood to the population of southern Okinawa to be used for kitchen hearths [354] and bath stoves. In recent years kerosene kitchen stoves have become so popular that the depletion of wood resources tends to coincide with decreasing demand.

TRADES AND PROFESSIONS

463 Other ways of making a living exist. A few artisans in Taira derive part of their income from wage labor. A number of Taira men earn their living by carpentering, although they do most of their work in the south. They return occasionally when their services are needed for [465] local house building. When working on local construction, they are paid in money, free lodging, and meals. There are also a few part-time resident carpenters who, whenever they are not employed in house building or repairs, spend their time farming and cutting wood. New [342] buildings are usually put up between the beginning of the second rice crop and the New Year.

463 Several persons are salaried township or village officials. They are 466 paid monthly and work a 44-hour week, not counting many extra meet- [647] ings and duties connected with their work. All office workers however have fields, either their own or those of their parents, where they spend Sundays helping in agricultural pursuits. During rice planting season, they are given special time off to attend to their fields.

Also among the salaried workers are store employees, a full-time

462 heavy sods in the rice paddy; nevertheless, women and younger girls
[241] often do this work along with the men and boys if time runs short. There are some women who prepare their farm land without the help of their husbands.

[313] In mountain work, women produce almost as much as men except
[843] that they do not handle the large logs. Even pregnant women make three or four daily mountain trips, sometimes up until the day of
[482] childbirth. Only the mode of carrying wood, like any load, differs for the sexes: a man uses a carrying stick supported on his shoulder, with two bundles attached to each end; a woman carries bundles on her back, tied and held in place by a tump line tied over her forehead. Women can carry loads of 100 to 120 pounds in this manner.

[312] Men seldom carry water from the tank or faucet to the house; this is considered women's work, although younger boys are expected to
241 help at times. Work in the potato fields is mainly women's respon-
462 sibility. Their hands are also preferred in rice transplanting, where dexterity is needed in pulling out the tender shoots from the seed bed and replanting them in straight rows at measured intervals. Occasionally a young man helps, and boys sometimes try to work along with their sisters when they learn transplanting. Both men and women sow
462 the seed beds. In special activities, such as house building, a more dis-
[342] tinct division of labor can be observed. In any building activity, men do the structural work and women carry materials and cook for the
[653] men. The same division of labor is found on community projects, road building, fencing against wild pigs, or repairing the water pipes. In general, however, no special comment is made if either a man or woman performs work usually done by the opposite sex.

887 Men and women work in the fields and forests from ages 15 to 60.
462 When they approach 60, men like to "retire." If possible, they turn over their responsibilities as household heads to their eldest sons. From
[464] then on, they tend to stay home more and more. They can still help with less demanding work, making bamboo rings for firewood bundles, sawing wood, or doing odd jobs around the house. Approaching old age, most men become economically useless and in other ways contribute little to society. For old women, quite the contrary is true. Even grandmothers who are well over 60 seem strong and active. Most of
[241] them go to the fields to plant or harvest potatoes or other vegetables. One woman, well into her sixties and bent over from arthritis, took long walks to distant potato fields, with a heavy load of slips or potatoes in a basket on her back, a hoe on top of it, supporting herself on a
[855] stick. Other grandmothers look after the youngest children, thus freeing the mother for work. Old women also cook, help bundle firewood,

ments fail to form rope. Her brother quietly takes the straw and without a word demonstrates the deft movement. She watches and tries again when her brother hands it back to her. She is unsuccessful. As she starts to whine again, her brother picks up a length of finished rope and gives it to her. She runs happily toward the playground, waving her rope in the air. 868 [283]

Although young children are not taken to the mountains, they can sit in the village afternoons and watch adults sawing, splitting, and working the bamboo rings used in tying faggots. Boys do not go into the mountains to cut firewood until they are about 10 years old, girls until they are 12, although they may have begged their parents for several years to let them help with cutting and hauling of firewood. But as long as they are still too young for mountain work, they try to use the cutting tools. Tools are left within reach of children so that opportunities for experimentation are almost unlimited. Only their size and weight deter the youngest children. A 2-year-old girl was seen imitating her mother by attempting to whittle off pieces of bamboo with a large 12-inch blade bushknife. A teen-age girl working nearby passed the little girl several times without saying anything. The little girl's father also worked nearby but, like everyone else, was too absorbed in his work to notice his daughter. Finally her mother looked up from where she worked, noticed the huge knife in the girl's hand, and saying in a loud, angry voice, "Why do you carry this, fool?" took the knife away. [313] [412]

Other small children pick up hoes and forks to try them in the yard or in the pigsty. Sickles and knives are used expertly by many 6-year-olds. Bandaged fingers and numerous little scars are evidences of learning and experimentation. Occasionally an adult will say to a 9- or 10-year-old, "Hold the sickle this way so you won't get hurt," but more often than not the child has already learned by himself. One 4½-year-old boy shinnied up the side of a feed box to get a sickle. There was no adult around to peel the long stalk of sugar cane he had been given, so, with expert strokes and handling of the razor-sharp tool, he shaved off the thick, hard skin. By the time his mother arrived on the scene, the child was busily chewing and sucking on a considerable length of the peeled cane. The mother was asked who had taught him to use the sickle, and she was at a loss for a reply. "I don't know! He must have watched us and learned by himself by trying it out!" she said. [412] [264]

Little girls watch their mothers cooking and doing other household work. By watching and asking questions they learn how to light a fire and when to extinguish it to cook a perfect pot of rice. They [252] [296]

313 Home Industries and Famous Products The forested northern mountains give rise
314 to small scale lumbering, charcoal making,
433 and firewood gathering. Kunigami-son and Kushi-son emphasize the gathering of
bamboo and firewood. On the other hand the making of charcoal is more import-
[369] ant in Nago, Haneji, and Ōgimi. The urbanization of the south combined with
[391] the postwar extension of roads into formerly inaccessible parts of the north
have accelerated exploitation of the northern forest resource. Particularly
heavy is the demand for long roof poles, or kichigwā, after every major typhoon.
[237] Kunigami-son and Higashi supply the bulk of these. Where wood is plentiful
behind a coastal road, one often finds lime kilns, which process the coral of
the reefs.

258 The sea is also a major source of material for home industries. Sea
433 salt is made at Yagaji, Urasoe and Oroku on the west coast, at Henza and Awase
[237] on the east. Kunigami-son prides itself upon its production of seaweed. But-
tons from seashells are made in Mawashi. Fish cakes ('kamaboko') are made in
quantity in Itoman and Naha, with lesser amounts being produced in Ishikawa and
Nago. Dried bonito ('katsuoboshi') is a specialty of Tonaki isle to the west.
Motobu-chō holds second place, followed by the western isles of Tokashiki and
505 Zamami. For over a hundred years the small cargo sailboats ('Yambaru-sen')
178 of the east coast have carried forest products from the north. The extension
of roads into the northern forests has greatly reduced the amount now carried
by sea.

433 Horse breeding is a specialty in Nakazato (the eastern half of Kume-
[232] shima), which has 22% of the gunto's production of horses. However, the pro-
[233] duction of horse and cattle hides is concentrated in the urban areas, which
account for 84% of the hides produced. Nakazato is also famous for production
[231] of silk cocoons, being responsible for about two-fifths (38.7%) of the gunto's
total. The leading mainland producer is Motobu-chō, with 9%.

Although Okinawa is not self-sufficient in tea, the three areas of
[245] Oushikawa, Ishikawa and Kunigami produce over half of the local tea. In Oku
[479] village of Kunigami, the tea factory is a cooperative venture. Oushikawa
[275] and Chatan pride themselves upon possessing 'sake' and 'awamori' distilleries.
[284] Mawashi is the center of production of farm tools, and accounts for some
weaving of banana cloth. Weaving of mats from the "seven isles reed"
('shichitō-i') is a local specialty of Kanegusuku.

[314] Travertine quarries are found in Motobu-chō and Katsuren. A sandy
limestone is quarried at Minatogawa in Oushichan.